Enclosure 1 - Detailed EPA comments on the Section 404 Permit Application for Bear Run Mine Amendment 5

Watershed Condition & Aquatic Resources of National Importance

The White River is a two-forked river which runs through a substantial portion of central and southern Indiana, a Traditionally Navigable Water (TNW) as determined by the Corps of Engineers, Louisville District, and the major tributary to the Wabash River. The USDA Natural Resources Conservation Service conducted a Rapid Watershed Assessment of the Lower White River watershed. According to the assessment, excessive amounts of sediments, nutrients, and bacteria degrade the water quality in these watersheds, causing unbalanced fish communities with depressed populations and limited diversity.[1]

The Wabash River drains two-thirds of Indiana's 92 counties as it flows over 475 miles to its confluence with the Ohio River south of Mount Vernon.[2] The Busseron Creek watershed, a tributary to the Wabash River, is approximately 235 square miles in size and is located in Southwest Indiana.[3] A majority of the watershed (82%) lies in Sullivan County, Indiana. The watershed also occupies smaller portions of Clay, Greene and Vigo Counties. According to the revised draft Busseron Creek Watershed Total Maximum Daily Load, "Several waterbodies in the watershed do not meet water quality standards and appear on Indiana's Clean Water Act 303(d) list of impaired waters."[4] The waterbodies listed for impairments that would be impacted by this project are Buttermilk Creek and Middle Fork Creek. There are six industrial dischargers associated with active mining that are potential sources of TSS, pH and metals in the Busseron Creek Watershed and include the Bear Run mine.[5] The continued extensive loss of headwater tributaries and wetlands caused by the Bear Run Mine has the potential to exacerbate existing water quality impairments and further degrade watershed conditions.

During mining, sediment concentrations and loading rates can increase dramatically compared to the pre-mining condition.[6] Increased erosion and transport of sediments associated with mining can alter the flowrate of stream channels downstream, transport chemicals downstream, compromise stream stability and geomorphology and adversely affect downstream aquatic ecosystems. Studies have found that more frequent, higher daily flow volumes occur during the active phases of mining compared to pre-mining conditions.[7] This may be attributable to the loss of vegetative cover that normally

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[1] USDA, Natural Resources Conservation Service. "Rapid Watershed Assessment Lower White Watershed".
[2] http://www.in.giv/dnr/outdoor/4476.htm
[3] Busseron Creek Watershed Total Maximum Daily Load Development, *Revised Public Review Draft.* January 13, 2012.
[4] Id.
[5] Id.
[6] Bonta, James V., 2000. "Impact Of Coal Surface Mining And Reclamation On Suspended Sediment In Three Ohio Watersheds." *Journal of the American Water Resources Association* (JAWRA) 36(4): 869-887.
[7] Bonta, James V., C. R. Amerman, T. J. Harlukowicz, and W. A. Dick, 1997. Impact of Coal Surface Mining on Three Ohio Watersheds-Surface-Water Hydrology. *Journal of the American Water Resources*

reduces runoff volumes and promotes absorption of water for vegetation growth. Modern reclamation practices may reduce some of the environmental effects of surface coal mining; however, EPA believes there is the potential for significant harm to a landscape and its watershed to occur during the active phases of coal extraction.

Permitted and Proposed Impacts

A Section 404 permit was issued for the Bear Run East Pit project, LRL-2006-1614-GJD (S-256-1, S-256-2, S-256-3), in October 2007. EPA objected to the project in a letter dated March 1, 2007 because the alternatives analysis was deficient and the mitigation plan was inadequate to compensate for unavoidable impacts. Additionally, EPA asserted that the project would likely result in further impairment to Black Creek-Brewer Ditch and Buttermilk Creek water bodies in the Busseron Creek watershed. The Bear Run East Pit permit area is 4,476 acres in size. Permitted impacts include 122,785 linear feet of stream and 61.6 acres of wetland.

A Section 404 permit was issued for the Bear Run Amendment 4 project, LRL-2010-193-GJD project (S-256-4), in February 2011. The Region previously commented to the U.S. Army Corps of Engineers that Bear Run Amendment 4 would have a substantial and unacceptable impacts to an ARNI under the 404(q) MOA. EPA's letter to the Corps of Engineers, Louisville District, on June 11, 2010 recommended that the Corps undertake an EIS for this mine. The Corps chose not to pursue an EIS. Following multiple revisions to the application in response to EPA comments and the inclusion of additional mitigation in the form of 20,340 lft of stream and 88 acres of wetland as a condition of the Section 404 permit, EPA lifted its objection to Bear Run Amendment 4. Permitted impacts include 126,686 linear feet of stream and 27.46 acres of wetland.

Bear Run Amendment 5, LRL-2011-1117-gjd (S-256-5), would impact 514,498 linear feet of streams and 157.81 acres of wetlands. The project is located west of Bear Run East Pit and Bear Run Amendment 4. The SMCRA permit application and Section 401 application are under review by the Indiana Department of Natural Resources and Indiana Department of Environmental Management (IDEM), respectively. EPA requested that IDEM authorize discharges from the Bear Run Mine under a National Pollutant Discharge Elimination System (NPDES) individual permit because the receiving waters are impaired, and Indiana's NPDES general permit, under which the mine now discharges, does not contain water quality-based limits to protect the waters. To date, IDEM has not acted on EPA's request. Depending on IDEM's final actions regarding these concerns, EPA may raise water quality considerations that should be address by the Corps during their Section 404 application review (as per 33 CFR 320.4(d)).

Cumulative Impacts

As mentioned above, the Bear Run Mine has already been permitted to impact 249,471 linear feet of streams and 89 acres of wetlands. Amendment 5 would impact an additional 514,498 linear feet of streams and 157.81 acres of wetlands, bringing the total

permitted and proposed Bear Run Mine aquatic impacts to approximately 763,969 linear feet of streams and 246 acres of wetlands. According to the applicant, if Amendment 5 were permitted, the Bear Run Mine project would cumulatively impact approximately:

- 22.7 percent of the Middle Fork Creek watershed (051201111510),
- 20.7 percent of the Headwaters Maria Creek watershed (051201111801),
- 20.4 percent of the Brewer-Ditch Black Creek watershed (051202020603),
- 14.6 percent of the White River (Pollard Ditch) watershed (051202020801),
- 10.3 percent of the Buttermilk Creek watershed (051201111507),
- 3.6 percent of the Headwaters Black Creek watershed (051202020601), and
- 0.1 percent of the Singer Ditch-Black Creek watershed (051202020605).

The 404 (b)(1) Guidelines (Guidelines) require that the applicant demonstrate there are no practicable alternatives available that would have a less adverse impact on the aquatic environment for non-water dependant activities. The Guidelines presume that less damaging upland alternatives are available for these activities unless demonstrated otherwise by the applicant. [8] The applicant must follow a sequence of steps to be in compliance with the Guidelines; which include avoidance, minimization, and compensation for unavoidable impacts.

Status of Reclamation at Bear Run East Pit and Bear Run Amendment 4 & Reconnection of Aquatic Resources to the Watersheds

As impacts to Brewer Ditch-Black Creek were first permitted in the Bear Run East Pit area in 2007, these impacts are upstream of additional impacts to the watershed that were permitted in 2011 and the aquatic resources may still be severed from downstream waters due to active mining at the Bear Run Mine. Also proposed impacts to Middle Fork Creek were permitted in the Bear Run Amendment 4 area upstream in 2011 and based on the current operations plan Peabody would impact downstream portions of Middle Fork Creek via surface mining and reclamation for the entire life of the proposed Bear Run Amendment 5 mine (~17 years).

These are examples of the extensive temporal loss of aquatic functions and values that have occurred and will continue to occur if this mine is permitted as proposed. EPA recommends that Peabody provide information regarding the status of impacts, reclamation and on-site mitigation at Bear Run East Pit and Bear Run Amendment 4. This will define the extent of the aquatic resources actively being impacted and the status of the reclamation and reestablished watershed connectivity especially for watersheds such as Brewer Ditch-Black Creek, which would be affected by all phases of the Bear Run Mine.

Additionally, pit sequencing map(s) should be provided for the permitted and proposed portions of Bear Run Mine that illustrate a timeframe for aquatic resources impacts and accompanying information on reconstruction and reconnection of watersheds to

[8] 40 C.F.R. § 230.10(a)(3)

downstream waterbodies. Further, as Amendment 5 modifies the previous mine plan it should be determined if the new plan changes the regrading and stream restoration on the current Amendment 4 permit. This information will help identify the full extent of temporal loss and cumulative impacts to the affected watersheds.

Avoidance and Minimization

EPA believes that impacting 514,498 lf of several headwater tributary systems to the Middle-Wabash Busseron and Lower White River watersheds and 157.81 acres of associated wetlands may have adverse effects through the elimination of headwater stream functions, loss of diluting headwaters, and loss of nutrients and habitat. Headwater streams encompass over 80% of stream networks and watershed land areas[9] and "every important aspect of the river ecosystem, the river geomorphic system, and the river chemical system begins in headwater streams."[10] Headwater streams and their associated wetland and riparian systems provide floodwater retention, improve water quality by diluting and filtering pollutants from surface water runoff, and provide processed leaf litter and organic matter, which are important to sustaining biological communities in downstream waters. Collectively, organic interactions and improvements in water quality and stream channel conditions provide habitat for aquatic fauna. Additionally, terrestrial fauna including mammals and avian benefit from the interconnected stream corridors that create edge habitat, travel corridors and supply cover and food sources. Changes in land use in or near headwater stream systems such as deforestation, mining, agricultural development, and urbanization will affect the water quality and food web dynamics in downstream watersheds.

The applicant should present a reasonable range of alternatives that avoid and minimize impacts to aquatic resources onsite. The amount of effort and detail in the analysis must be commensurate with the level of aquatic resources impacted. EPA recommends that these alternatives include but are not limited to the changing of pit orientation, shortening of pit lengths and inclusion of alternative mining methods. In addition, proposed impacts to 59,524 linear feet of stream are from non-extractive activities. The applicant should identify a reasonable range of practicable alternatives that explore methods for avoiding and minimizing impacts to aquatic resources, especially from these non-extractive activities that are associated with mining operations.

[9] Naiman, R.J., 1983. The Annual Pattern and Spatial Distribution of Aquatic Oxygen Metabolism in Boreal Forest Watersheds. *Ecological Monographs* 53:73-94.

[10] Freeman, M. C., Pringle, C. M. and Jackson, C. R. (2007), Hydrologic Connectivity and the Contribution of Stream Headwaters to Ecological Integrity at Regional Scales. Journal of the American Water Resources Association, 43: 5–14.

Detailed comments on the Section 404 permit application

Baseline Information

- Page 14 of the application identifies the water quality data that will be collected from specific sites to further characterize water quality before and after mitigation. EPA recommends that Peabody also measure sulfates and DO, for these points since they are known impairments to a portion of the watersheds they propose to affect. Further, EPA recommends that these parameters be combined with the biological sampling to provide water quality and biological data during and post mining. This effort should include the implementation of corrective actions if the data shows negative trends in water quality and constituents of the biological community.

- Riparian buffer provides shading to decrease water temperature, reduce nonpoint source pollution, attenuate nitrogen, provide energy source for the stream, reduce runoff velocity and amount, stabilize stream banks and reduce erosion, the loss of a significant acreage would negatively affect downstream waters. The total acreage of riparian buffers would be reduced by120 acres from pre to post mining according to the *Woody Riparian Buffer* table on page 61 of the application. Based on this information, it is not clear how Peabody is actually increasing riparian buffer as stated in the application. EPA requests that Peabody clarify this inconsistency.

- As detailed on page 12, Buttermilk Creek is listed by the State of Indiana as impaired for sulfates, Middle Fork Creek is listed for low dissolved oxygen (DO), E. coli, and impaired biotic communities, Black Creek-Brewer Ditch is listed as impaired by the State of Indiana for sulfates and impaired biotic communities and TDS. Additionally, the current Total Maximum Daily Load Report for the Busseron Creek Watershed identifies the Bear Run Mine and Farmersburg Mine to the North as potential sources of TSS, pH and metals in the Busseron Creek Watershed.[11] A project must not be permitted if it will cause or contribute to further impairment of these waterbodies.[12] To ensure the project does not cause further impairment of these waterbodies, EPA recommends water quality and biological sampling be required during mining and a corrective action plan be developed to address potential excursions of water quality standards.

Operations and Reclamation

Peabody's Operation Map and Reclamation Plans are inconsistent with each other. Enclosures 3 and 4 overlay Peabody' s proposed dragline pit areas and adverse mining area (areas not to be mined) with their mitigation plan. The comments below summarizeEPA's concerns with these plans.

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[11] Busseron Creek Watershed Total Maximum Daily Load Development, *Revised Public Review Draft.* January 13, 2012.
[12] *40 CFR 230.10(b)(1).*

- SMCRA drawings indicate "Box Cut Disposal" to the east of each initial cut. This does not appear to be correct, as Amendment 5 is for the western extension of a previously permitted area, and these disposal areas are the mined-out pits from the previous cut.

- The existing mining operation on Amendment 4 has the dragline pits orientated east – west. While Amendment 5 illustrates that the pits are aligned north - south. There is no discussion as to why the previous orientation is not being continued with the new mining. The north – south orientation creates longer pits that intersect the drainage paths that flow predominantly from the northeast to the southwest. This would mean that the stream continuum will be interrupted for the entire period of mining and during reclamation. EPA requests that Peabody presents an alternative analysis which includes but is not limited to an operations plan with an east-west pit orientation.

- There is no discussion of the shortening of pit lengths to avoid water resources. This should be included in any discussion of alternatives regardless of pit orientation. EPA requests Peabody evaluate areas of avoidance by shorting pits lengths.

- There is no discussion about starting the mining at the western boundary and then mining to the east. This approach would allow faster reclamation of stream form and function. EPA requests Peabody provide a rational for not choosing this approach.

- Sediment control structures have been proposed within the stream channel, such as SB067. The 404 application does not explain why the applicant believes sediment control features need to be located in the channel as the existing topography would easily allow the structure to be excavated outside of jurisdictional waters. EPA requests Peabody remove the sediment control structure from the stream channel.

- The 404 application is unclear about the need for some areas to have been included with the permit boundary. These areas are located in the southern half of the proposed expansion, and include impacts to water resources and proposed mitigation despite the fact that the SMCRA application does not indicate any mining will take place. This is very noticeable in the SW area of the permit area south of County Road 900 South. There is no mining proposed in this previously mined area and no indication that the existing final pit impoundment is to be backfilled. The only evidence of proposed earthwork is the elimination of the impoundment on the Mitigation Map. This area also has a perennial stream identified for impact and mitigation. Please see Attachment 3 North Operations Map and Attachment 4 South Operations Map. . It is not clear why Peabody impacted the resources in this area. Peabody needs to clarify these inconsistencies.

- Neither the SMCRA nor 404 applications include any detailed post mining topography. Without this detail it is not possible to determine the gradient of each proposed stream reconstruction or the post mining drainage boundaries. Please provide a post mining contour map.

- In the cross-sections, "Pre-Post Mine Topography Cross-Section D-D', E-E', F-F'", the original ground surface appears to be raised by exactly 30 feet in the post mining contours. This proposal creates a final ground surface that would mirror the original surface at a higher elevation. This elevation difference could create an issue blending the existing topography to the offsite elevations and at areas within the mine limits that are avoided and connecting proposed mitigation to their upstream and downstream waters at the completion of reclamation. EPA requests Peabody to document how the post mining contours will blend with existing contours and unmined areas.

- The proposed mitigation streams and wetlands, shown in "Bear Run Mine (Amendment 5) Mitigation Map, Map C" appear to differ in some cases from the location and extent of the original streams and topography. Also it appears that some of the proposed mitigation will encroach on several protected buffer zones. It is not clear why Peabody would include water resources in their impact totals that flow through or originate in unmined areas. Peabody should address these inconsistencies.

- The SMCRA application indicates buffer zones around various properties and cemeteries within the proposed mining area. It is not clear if these controlling structures have been reflected in the post mining topography or what impact they might have on the stream reconstruction. Enclosures 3 and 4 show the location of these features and their buffers within the mine. Peabody should specifically identify these features on the post mining contour and mitigation map.

- Many of the proposed mitigation streams are identified as intermittent. It is unclear how the groundwater component will be effectively restored for these streams. There is no discussion about high compaction zones or ways in which to perch a water table in order to feed the streams. Peabody should address how the proposed flow regime will be achieved on the mitigation streams.

- Neither the SMCRA nor 404 applications address the issue of the final pit backfilling or a change to a permanent impoundment. If the final pit is to be backfilled then the source of the backfill material should be identified. The SMCRA drawing indicates a pond (SB079) but this is not reflected in the Mitigation Map. Please address this inconsistency.

- The SMCRA application indentifies two open water features that will not be reclaimed. However, these open water features are located directly in proposed stream and wetland mitigation areas. Peabody must either revise the on-site

mitigation plan to include these water features or explain where the material will come from to backfill them. See the "North Operations Map" enclosure 3.

Mitigation Plan

Currently, the mitigation plan for the proposed project does not appear to contain all the requirements set forth in the 2008 Compensatory Mitigation Rule. EPA's concerns on mitigation include the work plan, performance standards, monitoring and financial assurances (as per 40 CFR 230.94). EPA understands that the Public Notice stated that Peabody was still looking for additional compensatory mitigation, and notes that additional proposed mitigation must meet these same requirements. We look forward to working with the Corps and Peabody to further refine their compensatory mitigation plan. In assisting in the effort we offer the following comments in regard to the proposed mitigation plan:

Onsite Mitigation Plan

- Peabody is proposing Rosgen "E" type channels for a portion of the mitigation. It is unclear which reconstructed channels would be constructed as "E" type.

- Page 23 of the 404 application indicates that stream and wetland mitigation will take place as quickly as practicable, employing the best techniques available to ensure successful mitigation. Peabody should identify what it considers to be practicable, and include more detail regarding the conditions that must be met prior to construction of the mitigation streams and wetlands and the subsequent reconnection of the mitigated resources to downstream watersheds. Further, to understand the mitigation construction sequence, EPA requests a general mitigation timeline tied to the operations plan.

- Given the large number of ephemeral natural streams impacted and the stated overall reduction in riparian buffer proposed for mitigated ephemeral streams, EPA feels it is more appropriate to mitigate these streams at a 1:1 ratio.

- Peabody should clarify what "mixed" land use is, as the majority of impacts are proposed in areas identified as such.

- The *Wetland Seeding and Planting Stock Summary* on page 70 only includes 4 tree species. For a forested wetland type, a minimum of 5-8 species should be planted to ensure adequate species diversity.

Offsite Mitigation Plan

- Peabody needs to clarify the portions of the offsite mitigation that would be protected. It is not clear if Peabody proposes to protect the entire parcels or only the wetland, stream, and upland buffer portions of each parcel.

- The mitigation plan mirrors the onsite plan and includes only 4 species of trees. For a forested wetland type of plant community, a minimum of 5-8 species should be planted for adequate diversity.

- On page 10 and 11, Peabody needs to include the riffle-pool ratio or number of these features to be installed on the stream. Further, the profile of Busseron Creek Mitigation Plan depicts several features with varying depths but does not identify which feature, riffles or pools.

- Page 12 of the Busseron Creek Stream and Wetland Mitigation Plan, Peabody needs to revise the number of acres of PFO wetland from 90 acres to 135 acres

- The offsite mitigation plan does not specify buffer distance on the stream. Peabody needs to specify the buffer distance proposed on these mitigation streams.

Performance Standards

In general, the applicant needs to be more specific about the ecological performance standards to be achieved so that the success of both the onsite and offsite mitigation areas may be properly evaluated. EPA and Corps regulations require that an "approved mitigation plan must contain performance standards that will be used to assess whether the project is achieving its objectives."[13] The regulations also require that performance standards "relate to the objective of the compensatory mitigation project, so that the project can be objectively evaluated to determine if it is developing into the desired resource type, providing the expected functions, and attaining any other applicable metrics (e.g. acres)." These performance standards must be included in the mitigation plan.[14] The applicant must define success criteria in the mitigation plan.[15] These success criteria should be structured in a way that will demonstrate that post mining conditions will be similar to (when appropriate) or better than pre-mining conditions. Below is a list of EPA's concerns based on information available.

- Under *Stream Success Criteria* on pages 73-74 of the 404 application, the selected EPA Rapid Bioassessment Protocol metric goals appear to be low for C and E type streams. For example, the channel sinuosity metric performance goal for these types of streams is at the very low end of suboptimal which is generally not appropriate for these types of streams.

- Performance standards are generally lacking for trees in wetland and riparian buffer areas. Ecologically based performance standards should include measurements such as diameter at breast height (1.4 meters) and basal coverage.

[13] 33 C.F.R. § 332.5; 40 C.F.R. § 230.95
[14] 33 C.F.R. § 332.4(c); 40 C.F.R. § 230.94(c)
[15] 33 C.F.R. § 332.4(c); 40 C.F.R. § 230.94(c)

- Wetland areas should achieve 75% cover by native perennial hydrophytes and have less than 5% cover of invasive species.

Monitoring

- It is unclear why monitoring will not begin until seedlings are 30 inches high. These data should be collected beginning the first full growing season after construction to establish the baseline condition of the mitigation sites.

- The monitoring section of the application beginning on page 76 indicates that monitoring will continue for up to 10 years. This should be revised to require that monitoring continue for at least10 years, or until performance standards are achieved. Failure to show that the mitigation site is on a trajectory towards meeting performance standards or has achieved performance standards may extend monitoring time frame or require alternative mitigation.

- Peabody proposes to monitor wetland hydrology with wells, however no methodology or technical guidance document was provided. Peabody should provide the methodology for installing wells and criteria for monitoring hydrology on the mitigation sites.

- Peabody proposes to monitor biology at the bioassessment points, but does not indicate what the performance standard for biology or what the contingency measures would include if the streams do not meet the established goal. Peabody should update the monitoring plan to include biological performance standards. Further, they should develop contingencies measures for failure to meet established levels.

Financial Assurances

The applicant has not offered financial assurances specifically for the stream and wetland mitigation onsite, and asserts that the SMCRA bond is sufficient to cover the cost of reclamation, including revegetation and maintenance, with no further detail provided. The amount of required financial assurances "must be based on the size and complexity of the compensatory mitigation project, the degree of completion of the project at the time of project approval, the likelihood of success, the past performance of the project sponsor, and any other factors the district engineer deems appropriate."[16] The mitigation plan must include more detailed information to satisfy the Mitigation Rule so as "to ensure a high level of confidence that the compensatory mitigation project will be successfully completed in accordance with its performance standards."[17] One option may be to earmark a particular portion of the SMCRA bond to cover specific Section 404 mitigation construction and maintenance activities.

[16] Id.
[17] 33 C.F.R. § 332.4(c); 40 C.F.R. § 230.94(c)